

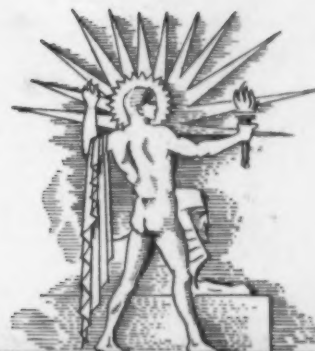
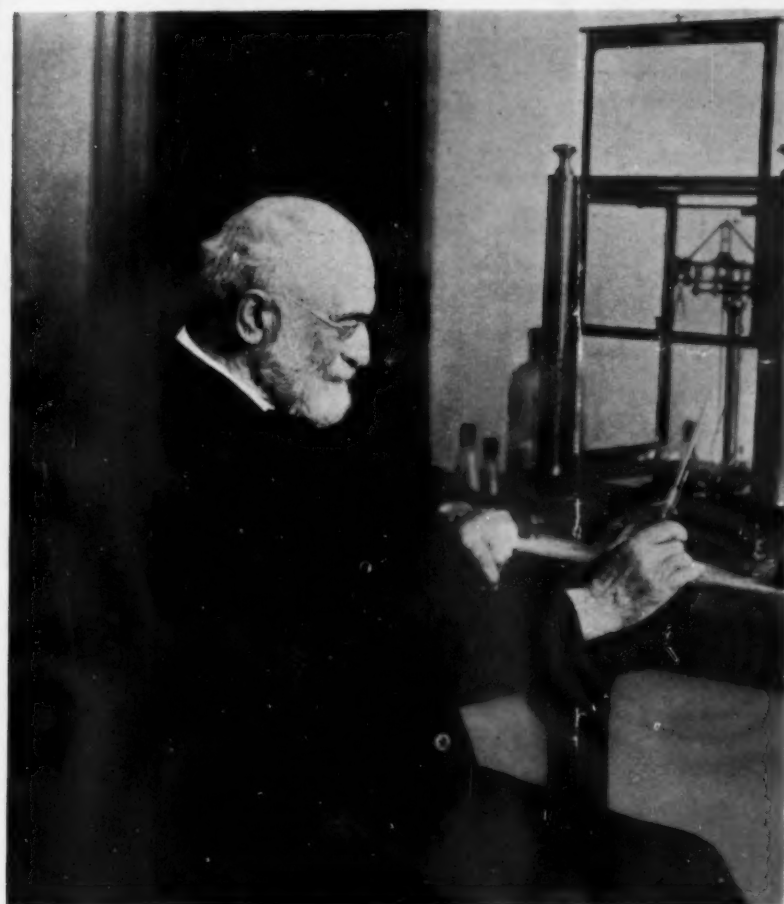
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SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE



OCTOBER 11, 1930

Prof. Babcock, Given The Capper Award This Week

(See Page 230)

A

SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

Vol. XVIII

No. 496

The Weekly
Summary of



Current
Science

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DO YOU KNOW THAT

The height limit for "skyscrapers" in London has been reduced from 90 feet to 80.

Modern complicated play equipment cannot compare with old-fashioned wooden blocks in holding the interest of four-year-old children, Eva Leah Hulson has discovered at the Iowa University Child Welfare Research Station at Iowa City.

Some Indians of the western plains decorated their ears by punching a row of holes along the edge of the ear and suspending little ornaments from the holes.

Newsprint, now manufactured almost entirely from spruce pulp, may be made from young pine trees if experiments at the U. S. Forest Products Laboratory prove satisfactory.

Ostrich eggs are used as water bottles in the Kalahari Desert country of Africa.

The single-span bridge now being built over the harbor of Sydney, Australia, is to be the biggest of its kind in the world.

A mirror for looking into the retina of a patient's eye was devised by Helmholtz in 1851.

Latest census statistics from the Irish Free State show 80 per cent. of the young men between 25 and 30 years old to be unmarried.

It is observed that dry trees struck by lightning are more likely to be destroyed or seriously damaged than trees soaked with rain.

WITH THE SCIENCES THIS WEEK

ARCHAEOLOGY		MEDICINE	
Colorado Yields Weapons and Tools	230	Maggot Treatment	226
Dog and Baby Sacrifice	230	Medico—Legal Practice	230
Glass as a Liquid	230	Miss McGann's Breathing Machine	227
		Possible Paralysis Epidemic	236
ASTRONOMY		METEOROLOGY	
Neptune's Day Measured	225	Sun Spots and Air Pressure	226
BOTANY		ORNITHOLOGY	
Strange Yellow Calla Lily	231	Departure of Chimney Swifts	231
CHEMISTRY		PHYSICS	
Glass as a Liquid	230	"A Classic of Science"—The Theory of Heat	232
Prof. Babcock's \$5,000 Prize Showing Up Check Raisers	228		
	231	PSYCHOLOGY	
ENGINEERING		Mother Important to Flappers	
International Road Congress	234		231
GENERAL SCIENCE		SOCIAL SCIENCE	
First Glances at New Books in Various Science Fields	238	Help For Deaf Pupils	231
ZOOLOGY		SOCIOLOGY	
A Sarcophagus of Pearl	237	Mice Show Effect of Slums	225
Thousand Sporting Whales	230		

Science Service presents over the radio, an address

EARTHQUAKES POLAND

What Can We Do About Them?

To be made by Captain N. H. Heck, Chief of the Division of the Terrestrial Magnetism and Seismology of the U. S. Coast and Geodetic Survey and leading authority on earthquakes in the United States

FRIDAY, OCTOBER 17, AT 1:45 P. M. E. S. T.

Columbia Broadcasting System

ASTRONOMY

Astronomer Finds Neptune's Day to be 15.8 Hours Long

Discovery By Dr. Moore, Who Also Measured Uranus' Rotation, Leaves Pluto and Venus To Be Studied

WITH THE discovery by Dr. J. H. Moore, Lick Observatory astronomer, that the planet Neptune turns once on its axis in about 16 hours, there remain only two of the larger members of the solar system for which the day is still unknown. Venus, which becomes brighter than any of the other planets, and which has been so conspicuous in the western evening twilight in recent months is one. The other is the newly-discovered Pluto, which represents the main contribution of 1930 to the history of astronomy, and which can only be discerned with the aid of a large observatory telescope.

It was the spectroscope, which analyzes the light of a star to tell what it is made of and how it is moving, that revealed to Dr. Moore the secret of Neptune's rotation. The light from the planets is reflected sunlight. Therefore the spectrum shows the dark lines crossing it that are characteristic of the spectrum of sunlight, the lines being caused by vapors of certain elements absorbing certain colors in the sun's light as it passes through the outer layer of that body. If light from a star, or planet, that is approaching the earth, is analyzed through the spectroscope, it is found that the lines are slightly displaced, towards the violet end of the colored spectrum. If the star is receding, on the other hand, they are shifted to the red end. This is because the waves are squeezed together and made shorter in the first case, while in the latter instance they are spread out and made longer. It is the length of the wave that determines color of light, so light from a rapidly approaching source is bluer and from a rapidly receding source redder than one that is standing still.

Secret of Spectrum Photographs

Dr. Moore photographed the spectrum of light from Neptune along a line crossing the planet's disc from east to west. The spectrum photographs showed the lines tilted, rather than

displaced in their entirety to one end or the other. This indicates, of course, that one side of the planet is approaching the earth and the other side receding, in other words that it is rotating. As the side of the lines made of light from the eastern edge tilted to the violet, it showed that the eastern side of the planet is approaching us. That is, the planet turns from west to east, like the earth, and all of the known planets except Uranus.

The faster the planet turned, the greater would be the tilt, so from a determination of the angles of the lines, Dr. Moore was able to measure the period of rotation, or "day" of Neptune. This came out as 15.8 hours, though he admits that there is a possible error in this figure of as much as an hour, either too fast or too slow.

Uranus Turns From East to West

Dr. Moore also has measured the day of Uranus. In 1911 Drs. Percival Lowell and V. M. Slipher, at the Lowell Observatory in Arizona, found by a similar spectroscopic method that Uranus rotates one in $10\frac{3}{4}$ hours, and that the planet turns from east to west, unlike all the other members of the solar



DR. J. H. MOORE

Of the Lick Observatory who has measured the length of a day on the planet Neptune

system. Dr. Moore has confirmed the direction of the planet's rotation, but gets slightly different values for the rotation with different sets of spectrum photographs. One set, made with a smaller spectrograph, gives values like those of Lowell's but another set, made with a more powerful instrument, gives about 11.5 hours. The latter photographs, however, are not fully exposed, and were difficult to measure. Dr. Moore said that the discrepancy is probably due to the small images of the planets, as a result of which such determinations are at best only approximations.

Science News Letter, October 11, 1930

SOCIOLOGY

Mice Crowded In Boxes Show How Slums Affect People

SLUM conditions in great crowded cities like London and New York are duplicated in colonies of mice raised in the laboratories of Prof. F. A. E. Crew of Edinburgh University. As a result Prof. Crew, the scientist who several years ago had a hen who turned into a rooster, has reported to the British Association for the Advancement of Science what happens eugenically when living conditions become overcrowded.

His mice were forced to live in very

crowded boxes, an experiment no more inhumane than everyday human life in city slums. Side by side with the slum mice, were other mice colonies in less crowded boxes which corresponded to the well-to-do sections of a great city. Such laboratory control is not possible with human beings and this is why Prof. Crew made his mice experiments.

The overcrowded mice showed a decline in birth rate and an increase in death rate. The baby mice born in the

slum boxes were weak and malnourished as compared with the more fortunate mice babies born in happier surroundings.

Then Prof. Crew acted like a thoughtful social worker. He tried the experiment of taking the expectant mouse mothers out of their slums into better conditions where they had plenty of air, light and food. Then the baby mice were healthy and normal in spite of the

fact that their mothers had lived in the slums.

Prof. Crew found that the slum conditions affected some mice individuals much less than others. He declared that by his eugenical box experiments it is possible through artificial selection to produce a "cockney" race of mice that do not mind being overcrowded by slum life.

Science News Letter, October 11, 1930

METEOROLOGY

Air Pressure Varies With Sun Spots in Monsoon Regions

Observations of Polish Scientist Indicate That Solar Radiation Influences Earth Through Area of Monsoons

DISCOVERY by Dr. S. Hanzlik, of the Meteorological Institute at the Charles University, Prague, that atmospheric pressure in the monsoon regions of the earth varies directly with the number of spots on the sun, may bring a step nearer the complete understanding of the relation between solar conditions and terrestrial weather.

In a report to the British scientific weekly *Nature*, Dr. Hanzlik announces that his studies have revealed the fact that for a large area in central Asia, south of latitude 55 degrees North, east of Caspian Sea, Mesopotamia, Persia, Afghanistan, Baluchistan, east Turkestan and the plains of the Indus the air pressure and sunspots increase together. A second such area lies north of latitude 10 degrees and extends from the Arabian Sea across southeast India, and the Bay of Bengal to Burma and Siam. Still a third such area, he finds, covers most of Australia and Java and extends eastward across the Indian Ocean to southern Madagascar and Natal.

Also Negative Relation

"These three fields," states Dr. Hanzlik, "cover approximately the greater part of the Indian monsoon area within the tropics. The fact that the sunspot period manifests itself always in the same way within this area suggests that sunspots affect the general circulation of the atmosphere through pressure conditions in the monsoon regions." The monsoons are the periodic winds that blow steadily for part of the year from one direction, reversing their

direction during the other part of the year.

Dr. Hanzlik has also sought for a region where there is a negative relation between sunspots and pressure, that is, where the pressure goes down as the number of spots increases. This is not so well defined, he says, but if there is any such area, it is probably a long strip stretching across the Pacific south of Hawaii and north of the equator.

If his theory is correct, and the influence of solar radiation on the earth is through the monsoon regions, the reason why other parts of the earth are not similarly affected might be due to a lag in the effects reaching them.

Science News Letter, October 11, 1930

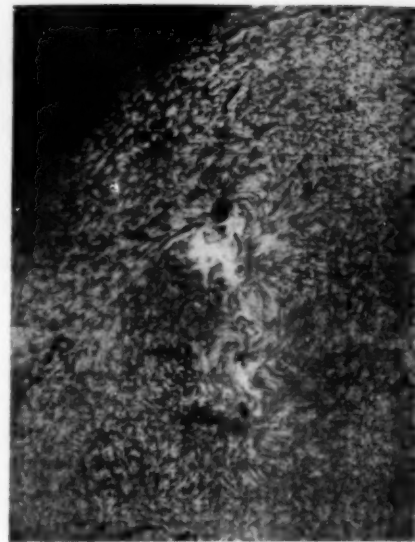
MEDICINE

Maggot Treatment Success Due to Unknown Reaction

SOMETHING more than a scavenger reaction is behind the successful healing of wounds by the new maggot treatment, its discoverer, Dr. William S. Baer of the Johns Hopkins University, told a group of scientists gathered for studying bone diseases and cancer of the bone.

A specific reaction between the serum of the body and the maggot itself probably causes the healing of wounds to which maggots are applied. Just what this reaction is has not yet been discovered, he said.

Dr. Baer told how his experiences as an army surgeon during the World War



SUN SPOTS

New evidence of their effect on the earth's weather has been found. This picture was taken in the light of a single wave length with the spectroheliograph and shows details invisible to the eye.

started him on the investigations leading to the new treatment. Two men were brought in who had been lying in the field for seven days without food. They suffered from abdominal wounds and from compound fracture of the thigh bone. The wounds were covered with maggots, the tiny larvae of flies. The men were hungry, but otherwise their condition was good.

In the hands of the best surgeons, the mortality for compound fracture of the thigh bone was 80 per cent., Dr. Baer knew. In other words, four-fifths of the persons who suffered from that condition died. In the hands of the maggots, the mortality for those two men was nothing, he found. Instead of the bad infections commonly found in such injuries, Dr. Baer found only a few harmless organisms.

For ten years he puzzled over these cases, particularly when treating children suffering from osteomyelitis. This disease of the bone is the result of an infection, is more common in children than in adults, and is extremely difficult to cure. If it reaches the chronic stage, recovery is often delayed for years. Finally he tried the effect of maggots on some of these cases. In six weeks the children were entirely well. Dr. Baer has used this method on 300 patients during the last two years. All the children have recovered entirely. With adults the treatment has been successful in four-fifths of the cases.

Science News Letter, October 11, 1930

MEDICINE

How The Breathing Machine Keeps Miss McGann Alive

Had She Been Stricken Six Months Ago, Death Would Have Come at Once, For the Respirator Was Not Ready Then

FOR three weeks a man-made respirator has kept life in the body of the Chicago nurse, Frances McGann, whose breathing muscles were attacked by infantile paralysis. According to latest reports, the girl is now able to breathe without the aid of the respirator for short periods.

The machine was designed by Drs. Philip Drinker and L. A. Shaw of the Harvard School of Public Health. When it was first announced to the medical world, physicians saw that one of its greatest fields of usefulness might be in helping victims of infantile paralysis whose breathing muscles became paralyzed. Until six months ago these patients were doomed to die.

The so-called metal lung acts by alternating air pressure with vacuum and thus keeps the patient breathing artificially.

If Miss McGann continues to live the physicians and others who have participated in the case will merit enthusiastic acclaim. They will have supplied a deficiency of nature.

We might build a model of the chest to illustrate how we breathe. To an upright stick we would loosely nail one edge of a series of hoops, one above another. The unsupported edges of the hoops would sag downward. Next we would cover the hoops with an air-tight fabric. The bottom of the contraption we would close, air tight, with a dome shaped piece of rubber, the dome projecting upward into the "chest."

Balloons for Lungs

Last we would close the top of the model except for a small hole. Inside, connected with the single hole by pipes, we would hang two light rubber balloons. Moreover we would have made some provision for exhausting the air between the balloons and the walls of the "chest." When this had been done the balloons would tend to swell and fill the cavity, just as the lungs fill the cavity of the real chest, without air between them and the chest wall.

This would not be a bad chest. The upright stick would represent the spinal column. The loosely nailed, sagging

hoops would take the place of the ribs, which are loosely attached to the spinal column and which sag downward in front. The dome-shaped piece of rubber, the bottom, would serve as a diaphragm, the thin sheet of muscle which separates the chest from the abdomen. The hole in the top, the pipes, and the balloons would represent the air passages and the lungs.

Now, if we wanted to make the model take in more air we could do one of two things: We could increase the inside length by pulling down the diaphragm, or we would increase the inside diameter by lifting the sagging unsupported edges of the hoops. In either case there would be a tendency toward the formation of a vacuum and air would rush into the balloons.

Control of Breathing

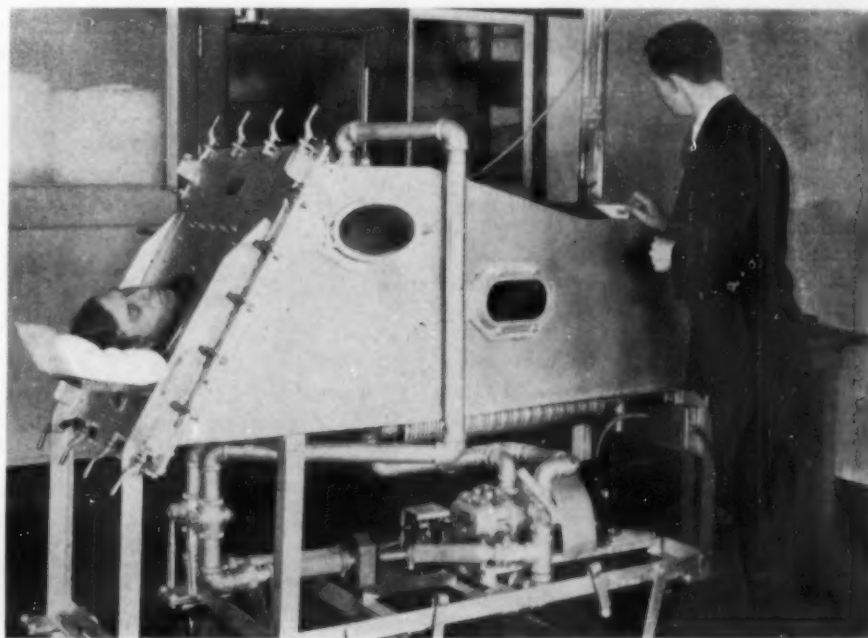
Substantially that is the way we breathe. We tighten the diaphragm which pulls its dome down out of the chest, and we lift the ribs by a complicated system of muscles. Air flows into the lungs, or, rather, is pushed into

them by the pressure of the surrounding atmosphere. However, nature has been so lavish in provision for breathing, as in provision for other vital functions, that animals and man can breathe and can live normal, active lives when the diaphragm has been disabled.

But there must be a control of this complicated system of muscles that we use in breathing—a method of synchronizing them. We do not have to think about inhaling and exhaling as we would have to think if we wanted to raise an arm or crook a finger seven-times a minute. Of course, the control resides in the nervous system. The most important factor in it seems to be what is called the respiratory center, about which considerable remains to be learned. At all events, it is situated in that part of the brain which takes care of us while we sleep or while our minds are on something else than keeping alive. The respiratory center is stimulated to action by the carbon dioxide which accumulates in the intervals of breathing.

When enough of this intricate system of muscles, nerves and chemistry of gases fails, man must step in with artificial methods. He may use the prone pressure method until he can place his patient in skilled hands, such as those which are ministering to Miss McGann, or, in cases in which the trouble is more with the respiratory center than with muscular paralysis, until someone skilled in administering carbon dioxide can be summoned.

Science News Letter, October 11, 1930



WHEN LUNGS FAIL

This artificial respirator begins to do their work. This is the kind of machine that has kept Miss McGann alive.

CHEMISTRY

\$5,000 Prize to Prof. Babcock For 40-Year Old Invention

He Filled a Request For a Test to Show How Much Butterfat Milk Contains---And it Has Made Dairymen Honest

THIS WEEK a Senator gave a Professor five thousand dollars.

There was in the transaction no hint of any cause for other Senators to start an investigation, fond as Senators have become of doing that sort of thing. On the contrary, everybody knew why the Senator gave the Professor the five thousand dollars, and everybody applauded the donation.

For the Capper prize of \$5,000 and a gold medal for the most distinguished service to American agriculture was awarded to Prof. Stephen M. Babcock of the University of Wisconsin because forty years ago he invented a machine that made dairying an honest business, and put the old farm pump out of commission as a source of sure-fire jokes. The award was made Thursday, October 9, in Madison, Wis., at the thirteenth annual banquet of the American Country Life Association.

The rewards of science are sometimes a bit leisurely in arriving. But then, perhaps Senator Capper didn't have so many \$5,000 prizes to spare forty years ago, and in the meantime Professor Babcock hasn't missed the money.

For the genial old gentleman (he'll be 87 on his next birthday, Oct. 22) is one of those rare souls who in a commercial age has never bothered about money. When he invented the Babcock test in 1890, it was recognized instantly as something of tremendous possibilities, and he was urged to patent it. Had he done so, and collected even the smallest of royalties, he would be a very rich man today. But he preferred to give his idea freely to the world, for everybody's profit, and he has never expressed the least regret at doing so.

Troubles of Dairymen

It is the milk test that bears his name that has really made Professor Babcock famous. And unlike many discoveries in science, even in applied science, it did not have to wait long years and fight its way against obstinate

conservation and entrenched opposition. It brought immediate and world-wide recognition and acclaim.

Some of the praise that has been bestowed upon the Babcock test would seem extravagant if it were not quite sincere and fairly demonstrable. The outstanding bit is the epigram attributed to former Governor Heard of Wisconsin: "It has made more dairymen honest than the Bible has ever made."

That is not so much of an exaggeration as it may sound. A generation and a half ago, when commercial creameries were beginning to figure as a major factor in American rural economics, they had troubles of their own. Their aim was to deliver milk, and especially butter, of high and uniform quality to the public, replacing the old uncertainties of small-scale milk peddling and "tub" butter made by rule of thumb at individual farmhouses. But they had to strive for this uniformity and quality pretty much in the dark, and often against sheer dishonesty. For milk is anything but uniform.

High grade milk contains around five per cent. butterfat, but there are plenty of mediocre cows whose milk yields

less than three per cent. And to the unaided eye it all looks pretty much alike. Add to that the tricks of the godless, adding water to the milk or "high-grading" some of the cream off it, and you have a riddle nobody could solve with his eye, no matter how experienced a milk handler he might be.

And there wasn't a scientific test for the percentage of butterfat in milk in existence during the eighties. So when young Doctor Babcock went to the University of Wisconsin from the New York Agricultural Experiment Station, with most of the shine still on his Göttingen Ph.D., his dean, W. A. Henry, put it up to him to devise one. He worked out two or three, but they didn't satisfy him; and he would not give up the search, although his colleagues thought that the others would be good enough for all practical purposes. Babcock wanted the right test; for him no bread has always been better than a half-loaf.

A Made-to-Order Test

The Babcock test is remarkable not merely for its very literal bread-and-butter importance, but for the manner of its discovery. It is, so to speak, a scientific discovery made to order. It is the claim of many scientists, sometimes most vehemently made, that "the spirit inspireth where it listeth," and that a scholar cannot be expected to make discoveries nor an inventor to invent like an army officer carrying out orders. As a rule this is true, and it is most true in the strictly theoretical fields. But often, especially in applied science, a set problem can be placed before a properly trained man, and if he has the making of a good soldier



SET AWAY TO CURE

The cheese-making industry was revolutionized by Dr. Babcock.

in him, and can see the importance of the job, a real discovery of major importance will result. That at least was the history of the Babcock test.

The test is such a simple thing when you see it made that you are tempted to wonder why the scientists and agricultural technologists of the world have been heaping praises and prizes on Professor Babcock's careless head for half his lifetime. The answer to that is the old story of Columbus and the egg. Somebody had to think of it first.

All there is to the Babcock test is to put samples of the milk to be tested into some long-necked bottles with marks at proper intervals on their calibrated necks, pour in sulphuric acid, and whirl the bottles in a centrifuge. When the machine is slowed down the milk is in the bottles and the butterfat is up in their necks, where the percentage can be read off directly by the grade marks. Sounds simple.

But it is worth while to look at milk a little more closely, to see why through all the centuries of butter-making nobody ever worked out this test, and why it was a chemist at last, with really very little knowledge about the practical problems of commercial dairies, who thought of dumping sulphuric acid into milk and then whirling it around to make the cream "rise."

Milk is not a single, simple, uniform substance like water. It looks as though it were "all one piece" when it comes out of the cow, but as everybody has seen thousands of times, if milk is left to itself for a little while it separates itself into two parts. One of these we call cream, the other skim milk. And if we churn the cream, we again get a separation, this time into a nearly pure fat—butter—and thickish milk we call buttermilk. But, if we squeeze the butter, a thin watery stuff comes out; so butter has at least two substances in it. And if we let the skim milk alone until souring bacteria have done their work upon it, we find that it "curdles"—separates into a semi-solid, cheesy substance and a thin, watery fluid called whey.

What Is In Milk

So even without any chemicals or any knowledge of chemistry, we have all seen what a complicated substance milk is. Chemists, with their more exact methods, have not yet unriddled all its complications. But they do know that the things that are mixed into the water that makes up somewhere near 90 per cent. of even the best milk can be divided into two general classes. One



A FARM YARD MILK TEST

A Babcock "laboratory" is very likely to be used in the open.

is made up of a lot of things—sugar and proteins and mineral salts—that can be dissolved in water. This constitutes the "milk plasma," roughly corresponding to skim milk. The other class contains a single substance—butterfat.

Butterfat, like all fats and oils, will not dissolve in water. But like all fats and oils, it can be shaken up in water or a watery solution so that it is separated into a host of tiny droplets that hang suspended, rising to the surface only slowly. This kind of a solution-full-of-fat-drops is called an emulsion. Whole milk is an emulsion of butterfat in skim milk.

But to get a real picture of how much butterfat there is in a given lot of milk you should be able to get the butterfat droplets—all of them, even the tiniest—out of their films. The fat must come to the top not as the complex stuff we call cream, but as pure fat, and nothing else but. And it must be done in a hurry, too: no time in the rush of a modern dairy business to pound it for hours in a churn until the films are broken by sheer brute force. Anyhow, even churning doesn't get out all the fat.

No, the job has to be done some other way. And that was the problem that was put up to Professor Babcock forty years ago. He solved it not by thinking especially of milk, but by going back to the fundamental principles of chemistry. He knew that one reason

why the films that surround the fat droplets are so obstinate about letting go is that they are not pure water, but contain, among other things, the substances known as proteins. We see some of them later on, more or less solidified, in cheese. In the milk they are thin and runny, but tough, like a mixture of white-of-egg in water. So they tend to bounce or stretch rather than to break when they are in thin films surrounding a fat droplet.

Hard to Satisfy

Professor Babcock pondered these things as he messed around with innumerable milk samples, back in the late eighties, devising some tests that were satisfactory to other people but not to himself. For Professor Babcock is an obstinate man, and hard to satisfy, when his own results are concerned.

His general knowledge of chemistry reminded him that proteins and protein-like things are soluble in sulphuric acid, and that fats in general are not.

Here was the key to the problem. He began adding sulphuric acid in various quantities to milk samples, and was rewarded by seeing the butterfat come to the top, not as cream containing a lot of milk films, but as clear yellow drops of oil. It took a while longer to find just how much acid was needed, for he wanted enough to release *all* the butterfat, yet not an excess.

(Turn to Page 239)

ARCHAEOLOGY

Colorado Yields Half Ton of Indian Weapons and Tools

HALF A TON of stone axes, arrow points and other weapons and tools once used by Indians who lived in Colorado have been gathered by an archaeological expedition from the University of Denver, led by Prof. E. B. Renaud.

The expedition, which has returned to the university, covered 10,000 miles in making the first archaeological survey of eastern Colorado. More than 250 Indian sites were found. The survey fits into the Smithsonian Institution's program of locating as many of the old Indian camping grounds, villages, and shelters as can be identified today.

Indians of different parts of the region explored used different materials for their stone implements, the survey found. Petrified wood from the Black Forest was found "just as good" as ordinary stone in the central highlands. Quartzite of varied colors was most used in some other sections. Flint was common in the northern part, and a black slaty material was much employed in the southwest.

Science News Letter, October 11, 1930

CHEMISTRY—ARCHAEOLOGY

Glass Is Called a Liquid, With Qualifications

GLASS, which has been stuff of mystery and secrecy for thousands of years, is now explained in scientific terms, and the explanation is as much like magic as the ancient Assyrian formulas. Glass is a liquid, George W. Morey, of the Carnegie Institution of Washington, has concluded. It is a liquid in a state of suspended animation.

Only three ingredients mixed in the proper proportions and melted and cooled can produce this unique state of matter, and it is one of the strange facts of prehistory that this narrowly limited combination was discovered by primitive men, probably in Syria, perhaps as far back as 5500 B. C.

"To keep the secret of the proper proportions of the various ingredients of glassware has been the prime motive of the secrecy and mysticism within which glass manufacture has been shrouded from the earliest times to the past decade, and from the influence of which the industry has not yet freed itself," declares Mr. Morey in *Art and*

Archaeology. "The reason for this restricted composition range is to be found in the physico-chemical relationships of the ingredients, and once these relationships are known, long-cherished glass formulæ become obvious deductions from them. These physico-chemical relationships have only recently been discovered by workers in the Geophysical Laboratory of the Carnegie Institution of Washington."

The secret is simple, once it has been found out, Mr. Morey points out. The three ingredients of glass—lime, soda, and sand, when mixed in certain proportions have a particularly low melting point. As a result of this, by the time the mixture reaches its freezing temperature it is so stiff and viscous that the molecular change which would cause the glass to become opaque can hardly take place. Too little or too much of any of the ingredients and the glass becomes opaque, not durable, or otherwise worthless.

Science News Letter, October 11, 1930

MEDICINE

U. S. Following Europe In Medico-Legal Practice

EUROPEAN countries are far ahead of the United States in the practice of legal medicine, Col. Calvin Goddard of the Scientific Crime Detection Laboratory of Northwestern University has told members of the Association of Military Surgeons of the United States.

In 13 European countries which he just visited, Col. Goddard did not find a single police commissioner who was not either a doctor of medicine, a doctor of laws or a doctor of science. The medical expert for the court is a respected, honored person in Europe. He must have a degree in legal medicine as well as his regular medical degree, and he is expected to find the facts, not to help convict a prisoner or suspected criminal.

At the Northwestern University laboratory, work paralleling that of the medico-legal institutes of European countries is being undertaken. Identification of bullets with the guns from which they were fired; analysis, examination and identification of material scraped from the finger nails of a dead man or a suspect; and lectures to state's attorneys, police lieutenants, and detectives are among the many ways in which the new laboratory is assisting in clearing up crimes. The laboratory or school is the first of its kind in this country.

Science News Letter, October 11, 1930

IN SCIENCE

ARCHAEOLOGY

Dogs Sacrificed With Babies At Babylonian City, Kish

NUMEROUS jars containing remains of babies, found at the ancient Babylonian city of Kish, suggests that children were sacrificed to the gods in that city. Small dogs buried with some of the children indicate that these pets were also sacrificed so that they might protect the babies in the future world. These discoveries from the ruins of the city are described by Henry Field, anthropologist of the Field Museum of Natural History, in a statement from the museum.

Mr. Field, who was with the Field Museum-Oxford University Joint expedition at Kish for some time, states that during the excavations in the Babylonian levels, approximately 2,500 years old, numerous burial jars containing children, were unearthed. The majority of the babies were girls.

"The burial jars had been placed along the walls of the more important buildings," he explains, "and it seems plausible to suggest that these babies may have been sacrificed to propitiate the gods in whose honor the buildings were erected."

Science News Letter, October 11, 1930

ZOOLOGY

Thousand Sporting Whales Sighted By Airplane

USE OF the airplane for scouting various fishes has been successful in many places, but an unusual sight was revealed to Aviator Frank Dorbandt while flying high above Cook's Inlet, Alaska, recently. Fully a thousand whales played and sported in the sea under him and to assure himself of their numbers he circled over them several times. Spouting, rolling and diving the whales seemed given more to basking in the sun than to seeking or pursuing any species of food fish. Some kinds of whales migrate in the late summer to the south and it is possible the pilot noted one of these movements.

Science News Letter, October 11, 1930

NEW FIELDS

CHEMISTRY

Ultraviolet Light Shows Up Check Raiser's Changes

THE TREATMENT of check paper with æsculin, a white powder obtained from the bark of the horse-chestnut tree, makes it possible for the bank teller to detect with ease erasures and changes which otherwise might escape notice.

Æsculin fluoresces, or glows, when placed under ultraviolet light. An erasure on paper treated with this substance would show up as a dark spot on an otherwise luminous surface. A patent on the process has just been granted to Dr. D. Julian Block.

Science News Letter, October 11, 1930

SOCIAL SCIENCE

Modern Studies to Aid Retarded Deaf Pupils

A CHILD whose hearing is even slightly defective is handicapped in the race to keep up with the other children in school. Greater loss of hearing increases a child's difficulties. This is reported by psychologists and educators studying the causes and effects of deafness among children of Philadelphia.

The investigators report that children with impaired hearing made lower ratings on intelligence tests of a standard type, they were more retarded in progress from grade to grade, they made lower school records. They also suffered more from malnutrition, showed a higher percentage of sight defects, and a greater amount of speech defect.

The investigation was conducted by Dr. John L. Waldman and Dr. Francis A. Wade, supervising principals of the public schools, and by Dr. Carl W. Aretz, president of Ellis College. Dr. Thaddeus Bolton, of Temple University, has been directing the work, which links with his own studies on deafness.

In a cross-section of 1,600 children in public schools, five and a half per cent. were considered deaf enough to form a special problem.

With the improved instruments now available for detecting and measuring deafness, it is possible to accumulate facts about the situation more rapidly, and to develop new ways of aiding the deafened child, Dr. Bolton points out.

It was found that children who are partly deaf tend to develop unconsciously a skill at reading the lips of other people to compensate somewhat for their handicap. This shows the usefulness of formal training in speech reading for such children, Dr. Bolton declares.

Science News Letter, October 11, 1930

ORNITHOLOGY

Chimney Swifts Gathering To Leave for Unknown

A MYSTERY of the air that may not be solved until the forests of the Amazon have been explored lies in the sudden disappearance each fall of hosts of chimney swifts from the United States.

At various centers throughout the country these birds are flocking now in preparation for their scheduled take-off about the first of October. Travelling in clouds they will journey southward to the Gulf States. Their final destination is as yet uncertain and it is only recently that they have been seen outside the United States. They have been noted several times in Haiti and were in Mexico apparently en route to some point in South America. A foolish legend of earlier times had it that they hibernate beneath the waters of lakes and marshes.

While the secrets of many bird migrations have been solved by bird banding enthusiasts, the route followed by the chimney swifts remains in part uncharted. The little numbered identification tags have been placed on more than thirty thousand swifts and, although many have been retrapped at various points within the United States, none has ever been recovered outside of the national boundaries.

Frederick C. Lincoln, assistant biologist, in charge of bird banding operations of the United States Biological Survey, says that the swifts fly at high altitudes where they cannot be identified easily but that some have been sighted going over Haiti. He believes they spend the winter months in the little known Rain Forest of the Amazon River, in Brazil.

Science News Letter, October 11, 1930

PSYCHOLOGY

Mother More Important Than Father to Flappers

TO girls of the flapper age, mother is more important than father, Dr. Anne H. McAllister has reported to the psychologists of the British Association for the Advancement of Science after an examination of 233 original stories written for children by eighteen-year-old girls studying to be teachers. Only a fifth of the stories mentioned father at all. And then father figured in the stories as a mere background to mother, usually as the parent administering punishment for wrongdoing. Six out of every ten stories mentioned the mother. In the stories written by the eighteen year olds troubles always ended magically by flight from reality into utopia or fairyland, while punishment always came as direct retribution for wrong.

Thirty-year-old teachers were less idealistic. Their stories for children ended by bettering conditions as they actually were rather than escaping from them into fairyland. And the punishments written into the fiction of the older teachers were not vindictive, but aimed at the correction of vices.

Science News Letter, October 11, 1930

BOTANY

Strange Yellow Calla Lily Noticed By Botanist

A FREAK calla lily which may become a plant of floricultural value is reported by James Lambert, director of the botanic gardens of the University of Pennsylvania and formerly of Kew Gardens, London.

The plant, which appeared among the specimens of flowers in the experimental section of the garden, is a golden calla of the species *Zantedeschia elliptica*. Unlike ordinary callas, however, it bears a leaf as well as a flower on its flower-stem, and the leaf is of the same bright color as the "spathe" or showy envelope of the inflorescence, which is itself slightly abnormal in shape and size. The rest of the foliage is of the usual green.

This species has long been known to have a tendency toward "sporting" in its flowers, but this is the first known instance of the flower giving its color to the leaf. It remains to be seen whether the tendency will be repeated in plants produced from the division of the root stock of this one.

Science News Letter, October 11, 1930

PHYSICS

"A Classic of Science"--- Fourier's Theory of Heat

THIS YEAR is the one hundredth anniversary of the death of the French statesman and mathematician, Fourier. He had been active in the stirring politics of the Revolution, the Empire and the Restoration. He had gone to Egypt with Napoleon and was instrumental in starting archaeological study there. His mathematical work on the theory of heat helped to bring to order many apparently conflicting phenomena. Here he explains something of his method.

THEORIE ANALYTIQUE DE LA CHALEUR, par M. Fourier. Paris, 1822. Translated for the Science News Letter by Helen M. Davis.

THE PRECEDING examples suffice to give a good idea of the various questions which we have studied. The solution of these questions has taught us that the effects of the propagation of heat depend, for each solid substance, upon three elementary qualities which are: the capacity for heat, the true conductivity and the external conductivity. It has been observed that, if two bodies of the same volume and of different nature have equal temperature and are treated with the same quantity of heat, the increases of temperature are not the same; the relation between the increases is to each as their capacities for heat.

Thus the first of the three specific elements which govern the action of heat is exactly defined, and physicists have known for a long time many ways of determining its value. It is not the same with the other two; but there has not been an exact theory which could well distinguish them, to define and measure them with precision. The true or interior conductivity of a body expresses the ease with which heat is conducted in passing from one interior molecule to another. The external or relative conductivity of a solid body depends upon the ease with which heat penetrates its surface and passes from the body into a given medium, or passes from the medium into the solid. This latter property is modified by the more or less polished state of the surface; it varies also with the medium in which the body is plunged; but the true conductivity can change only with the nature of the solid.

These three elementary qualities are represented in our formulas by constant numbers, and the theory itself shows the proper experiments for measuring the value. Once those are determined, all questions relative to the propagation of heat depend only upon numerical analysis. The knowledge of these specific properties can be immediately used in many applications of the physical sciences; it is moreover an element in the study and description of the various substances. It is to know a body very imperfectly to ignore the relations which it has with the principal agents of nature. In general, there is scarcely a mathematical theory which has more connection than this with public economy, since it can serve to clarify and perfect the usages of the numerous arts which are founded upon the use of heat.

Applied to the Earth

The question of terrestrial temperatures offers one of the most beautiful applications of the theory of heat; here is the general idea upon which it may be formed. The different parts of the surface of the globe are unequally exposed to the effect of the sun's rays; the intensity of this action depends upon the latitude of the place; it changes also depending upon the duration of the day and upon the time of the year, and is affected by other less sensible inequalities. It is evident that there exists, between this variable state of the surface and that of the internal temperature, a necessary relation which could be deduced from theory. It is known that at a certain depth below the surface of the earth, the temperature has no annual variation at a given place: the permanent temperature of these deep places is lessened in proportion as the



JEAN BAPTISTE JOSEPH
FOURIER

place is removed from the equator. One may therefore set aside an external envelope, whose thickness is incomparably small compared to the radius of the earth, and regard this planet as a mass nearly spherical whose surface is subject to a temperature which is fixed for all the points on a given parallel, but which is not the same for any other parallel. It results from this that any interior molecule also has a fixed temperature determined by its position. The mathematical problem will consist in knowing the fixed temperature of a given point and the law which the heat of the sun follows in penetrating into the interior of the globe.

This diversity of temperatures interests us the more, if we consider the changes which succeed one another in the envelope itself, whose surface we inhabit. Those alternations of heat and cold which recur every day and in the course of every year, have been till now the object of multiplied observations. Now it is possible to submit them to calculation and to deduce from one common theory all the particular cases with which experience has acquainted us. This question reduces itself to the hypothesis that all the points on the surface of an immediate sphere are affected by periodic temperatures; calculation then tells us that following some law the intensity of the variations decreases proportionally as the depth increases; that is, for a given depth the amount of the annual or diurnal changes, the period of the changes, and even the fixed degree of the subterranean temperature is deduced from the variable temperatures observed at the surface.

Equilibrium of Temperature

Equilibrium of temperature is brought about not only by contact; it is established also between bodies separated from one another which remain for a long while in the same place. This effect is independent of contact of the medium; we have observed it in spaces entirely empty of air. It remains therefore, to complete our theory, to examine the laws which radiant heat follows in leaving the surface of bodies. It follows from the observations of many physicists and from our own experiments that the intensity of different rays which go out, in every direction, from every point of the surface of a heated body depends upon the angle which their direction makes with the surface at that point. We have demonstrated that the intensity of each ray is lessened as it makes a smaller angle with the element of the surface, and that it is proportional to the sine of that angle. This general law of the emission of heat, which different observations have already indicated, is a necessary consequence of the principle of equilibrium of temperatures and of the laws of propagation of heat in solid bodies.

These are the principal questions which have been treated in this work; they are all directed toward a sole end, which is to establish clearly the mathematical principles of the theory of heat and to assist also in the progress of useful arts and from these to the study of nature.

Laws Peculiar to Heat

One perceives, from the preceding, that there exists a very extended class of phenomena which are never produced by mechanical forces, but which result solely from the presence and the accumulation of heat. This part of natural philosophy can not adapt itself to dynamical theories; it has principles which are peculiar to itself, and it is attacked by a method similar to that of the other exact sciences. For example, the heat of the sun which penetrates the interior of the globe is distributed following a regular law, which does not depend at all upon those of motion and cannot

be determined by the principles of mechanics. The expansions which produce the repulsive force of heat and whose observation serves to measure temperatures are, in truth, dynamic effects; but it is never these expansions which one calculates when one studies the laws of the propagation of heat.

Composite Forces

There are other more composite natural effects which depend at once upon the influence of heat and attracting forces; thus the variations of temperature, which the movements of the sun occasion in the atmosphere and in the ocean, continually change the density of the different parts of the air and the waters. The effect of the forces with which these masses obey is modified at every instant by a new distribution of heat, and one cannot doubt that this cause produces the regular winds and the principal currents of the sea; the solar and lunar attractions occasion in the atmosphere only slightly sensible movements and not general displacements. It should be necessary therefore to submit these large phenomena to calculation to discover the mathematical laws of the propagation of heat in the interior of the masses.

One recognizes, in reading this work, that heat effects in a body a regular arrangement, independent of the original distribution which one may regard as arbitrary.

In whatever manner the heat was first distributed, the initial system of temperatures, changing more and more, immediately blends perceptibly into a determined state which depends only upon the form of the solid. In this last state, the temperatures of all points fall in the same time, but keep the same ratio among themselves; it is to express this property that the analytical formulas contain terms composed of exponentials and quantities analogous to trigonometric functions.

Many problems of mechanics present analogous results, such as the isochronism of oscillations, multiple resonance of sounding bodies. Common experiments have made them known, and calculation has afterward demonstrated the true cause. As for those which depend upon changes of temperature, they can only be recognized by very precise experiments, but mathematical analysis outstrips observations; it makes up for our senses and gives us a kind of evidence of regular and harmonic movement of heat within the interior of bodies.

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Next Week

THE 137th CLASSIC OF SCIENCE

Presented by the Science News Letter will describe the first-micro-organisms seen by men, in the words of

LEEUEWENHOEK

One of the earliest possessors of a microscope

example of the relationship which exists between the abstract science of numbers and natural causes.

When a metal bar is exposed at one end to the constant action of a fire and all its parts have reached their highest degree of heat, the system of fixed temperature corresponds exactly to a table of logarithms; the numbers are the elevations of thermometers placed at different points, and the logarithms are the distances of these points from the fire. In general, the heat distributes itself in the interior of solids, following a simple law expressed by an equation of partial differences, common to physical problems of a different order. Radiation of heat has a manifest relation to the table of sines; for the rays, which go out from any point of a heated surface, differ much among themselves, and their intensity is rigorously proportional to the sine of the angle which their direction makes with an element of the surface. If one could observe for every instant and at every point of a homogeneous solid mass, the changes of temperature, one could find in the series of these observations the properties of recurrent series, those of sines and logarithms; one would find them, for example, in the diurnal or annual variations of temperatures of the different parts of the terrestrial globe which are near the surface.

One would recognize again the same results and all the principal elements of general analysis in the vibrations of elastic media, in the properties of lines or curved surfaces, in the movements of stars and in those of light or fluids. It is so also with the functions obtained by successive differentiations, which serve in the development of infinite series and in the numerical resolution of equations, corresponding also to some physical properties. The first of these functions, or fluxion properly so-called, expresses, in geometry, the inclination of the tangent of curved lines, and, in dynamics, the rate of motion during a variable movement: it measures, in the theory of heat, the quantity which is lost from every part of a body across a given surface. Mathematical analysis has thus the necessary connection with sensible phenomena; its object is never created by the mind of man; it is a pre-existing element of the universal order and has nothing of the contingent and the fortuitous; it is stamped on all nature.

Science News Letter, October 11, 1930

ENGINEERING

Use of Rubber Paving Brick Reported to Road Congress

RUBBER BRICKS have been used in slapstick movie comedies for years, but in some parts of Great Britain the streets are now paved with them. In a report to the Sixth International Road Congress held in Washington this week a British delegate told of the success that rubber paving has had in London, Newcastle, Edinburgh and Glasgow.

The first experiments to substitute rubber for brick and asphalt were made in 1913, it was stated. A rubber pavement in Glasgow, consisting of blocks of rubber $9 \times 4\frac{1}{2} \times 1\frac{1}{2}$ inches, was laid on a concrete base in 1923.

"Traffic in Glasgow is some of the heaviest and most trying class," the report states. "The cap of one block came away from its tread in 1925, this is the only defect reported. The paving is in good condition and shows no apparent wear after six years' use."

An installation in London was in New Bridge Street, which bears some of the city's heaviest traffic, with 17,623 vehicles, or 51,100 tons between 8 A. M. and 8 P. M., in addition to considerable night traffic. This was laid in 1926.

"After two years of wear, 416 blocks, or say four per cent., were renewed, and now at the end of the third year approximately another ten per cent. have to be renewed," the report states. "The defects are in the nature of blisters and the subsequent peeling off of thin layers of the cap where blisters appeared. The layers stripped off in no case extend the full surface of a block and are about one-fifth of an inch thick; the defects cause no inconvenience to traffic, but they collect dirt and are a blemish."

The paving costs about \$22.00 a square yard, laid without foundation, it was stated.

Three Dots, Road Closed

Three black dots, on a white sign with a red border, mean "Road Closed," if you encounter them on a road in Germany. This has proven much more satisfactory than a more complicated international system of symbols that has been urged, it was stated in a report of a German delegation to the Road Congress.

"Attempts to indicate by various symbols on the face of the signs the particular types of vehicle to which the restriction is applicable, have not been entirely satisfactory, because single pictures do not stand out clearly from their background when viewed from a distance," the report states. "This was confirmed by experimental investigations carried out by the Psychological Research Board of the Police Institute for Technic and Traffic."

"These experiments, which so far have only been conducted in the laboratory and are not completed, have shown that the time required to grasp the meaning of the international symbol system is about twice that required in the case of the dot system. Even if the symbols on the signs were still more

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912

OF SCIENCE NEWS LETTER published weekly at Baltimore, Md., for October 1, 1930.
Washington } ss.
District of Columbia }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Watson Davis, who, having been duly sworn according to law, deposes and says that he is the Editor of the SCIENCE NEWS LETTER and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Editor, Watson Davis, 21st and B Sts., Washington, D. C.

2. That the owner is:
Science Service, Inc., 21st and B Sts., Washington, D. C., an endowed non-profit making corporation operating as the institution for the popularization of science, with no stock.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent. or more of total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

Watson Davis,
Editor.

Sworn to and subscribed before me this 13th day of September, 1930.

[SEAL]

Charles L. Wade.

(My commission expires April 6, 1933.)

Are you blindly groping for words to fit your thoughts?



"What word conveys the exact shade of meaning I desire?"

"Is there a better word than the one I am using?"

"What is that word I have forgotten?"

"Is there a word in the language which expresses my thought clearly?"

"How can I avoid this constant repetition?"

STRANGE, isn't it, with all the marvelous wealth of our English language that you should find yourself groping blindly for the answers to such word questions as those above.

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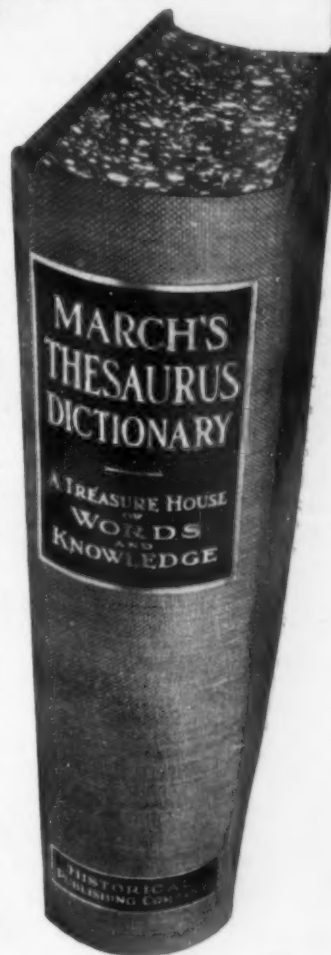
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conventional, the dot system would still be preferable. The dot is the symbol of wheels and motion. Under this system all wording is eliminated and increase in the number of dots expresses increasing degrees of traffic restriction."

Pedestrian Regulations in Paris

After many years in which no effort was made in Paris to force pedestrians to submit to traffic regulations when crossing streets, rules to that end are now in effect. In a report to the Congress, E. Lorieux and H. Giraud describe these regulations.

One light, instead of the three commonly used in American cities, was recommended by G. Luyssen and J. Hansez, Belgian engineers.

A plea for keeping roads and streets as narrow as possible and the declaration that unnecessarily wide roadways are a liability rather than an asset was made by Ignacy Drexler, professor of city management at the Polytechnic School at Lwów, Poland.

Science News Letter, October 11, 1930

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MEDICINE

Possible Paralysis Epidemic Depends on Next Reports

Turning Point is at Hand For a Disease Which is Hard to Recognize Early When It Can Be Treated Best

WHETHER or not the country will be stricken by a widespread epidemic of infantile paralysis will probably be determined within the next few days. The U. S. Public Health Service is anxiously awaiting reports from the various states covering new cases. For the week ending September 27, there were 594 cases. This represents an increase of about 100 cases over the preceding week.

Normally the seasonal increase in cases of this disease would have reached its peak by this time and additional reports should begin to show a decline in the number of cases. If the figures show an increase, public health officials will know that they are facing an outbreak of epidemic proportions. There are more cases of this disease in the country than there have been for the last three years. The last large outbreak was in 1927, when at the peak some 800 cases were reported. In the great epidemic of 1916, however, the cases were reported by the thousands.

Ohio reported 100 cases recently, the largest number for any state. Other high figures were 65 for New York, 65 for California, 43 in Illinois, 32 in Massachusetts, 21 in Maine, 21 in Iowa, 26 in Nebraska, 20 in Wisconsin, and 18 in Missouri.

Mothers Can Suspect

Cure of infantile paralysis, or poliomyelitis as it is called technically, depends on early recognition of the disease, for the methods of treating it are most successful when applied in the first stages. Mothers are always pretty much doctors to their children, and while they cannot hope to make a diagnosis of this disease unaided, they can learn to suspect its presence so as to call for medical aid in time.

Unfortunately, neither the cause nor the method of transmission of the disease are known. Control methods depend on isolating the patient. Prevention also depends on keeping children and young people away from persons suspected or known to be suffering from

the disease. In times of epidemics, it is wise to keep children away from strangers, also.

"The paralysis itself is due to the destruction of the nerve cells in the spinal cord which govern the movement of muscles," Dr. Lloyd W. Aycock of the Harvard Medical School has explained. "When these nerve cells are destroyed, the muscle with which they are connected loses entirely its power to function. It is like a telephone which may be in perfect order itself but which cannot function without a wire leading to it from the telephone exchange."

Definite Symptoms

Consequently treatment for the disease must be begun before the nerve cells have been destroyed, if paralysis is to be avoided. Once it has occurred, it is too late to cure it although patient treatment and care and exercise can do much for the affected muscles. Skillful treatment, if paralysis has occurred, is of great importance, because in growing children the pull of unparalyzed muscles against those which are paralyzed tends to produce serious deformity.

The paralysis is practically always preceded by certain definite symptoms. It is during this preparalytic stage before the nerves have been destroyed, that there is a chance of cure. Serum from the blood of persons who have passed through an attack of the disease is the one remedy at present available for treating the disease in the paralytic stage. Doctors speak of this as convalescent serum.

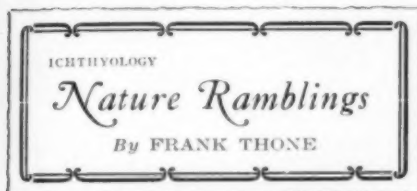
The onset of poliomyelitis is usually abrupt with fever, headache and stomach and intestinal upset. The child is drowsy and wants to be let alone. Usually he seems sicker and more prostrated than would be expected with the degree of fever, which is generally not over 102 degrees Fahrenheit. An anxious expression of the face, tremors and twitchings of the muscles and a sort of uncertainty in the movement of the arms and legs are characteristic of the early stages of the disease.

The most suggestive sign is stiffness of the spinal column and neck. The child will hold his head and neck rigidly and often he cannot sit up comfortably without propping himself on his arms.

Every stiff neck is by no means an indication of infantile paralysis, of course. The stiff neck of this disease is a rather special one. But if the mother finds such a symptom, she should at least suspect the disease and have the matter further investigated without delay.

The paralysis may set in anywhere from one to three days after the onset of the disease. The extent of it varies. When death occurs, it is from paralysis of the muscles used in breathing and not from the severity of the fever.

Science News Letter, October 11, 1930



A Sarcophagus of Pearl

THERE is in the American Museum of Natural History in New York a most curious pearl-shell specimen. Embedded under the nacre, or pearl substance, is the clearly outlined body of a tiny fish, the only fish known that has so costly a sepulcher. It is not rare for other objects to be so impearled. Every pearl starts with an irritation to the oyster—a grain of sand, a tiny parasitic animal, or something of that kind. Japanese pearl culturalists start pearls by inserting tiny beads between the lips of the pearl mussel's shell.

The story of the pearl-ensepulchered fish may be a drama of the oyster's conflict with a parasitic robber, or it may be a tragedy of the death of a comrade. Many small fish of the goby family love to lurk about in the shelter provided by larger animals instead of in natural rock cavities. "Messmates," some of them are called; others are known as "commensals." But commen-

salism may pass over, by insensible gradations, into sheer parasitism; and at least a few cases are known of small fish parasitizing large molluscs.

So the oyster that buried a fish in pearl was not necessarily giving mournful sepulture to a departed house-mate; it may have found the house-mate unendurable, killed him, and then sealed him over to get the carcass out of the way.

Science News Letter, October 11, 1930

Prof. Babcock

(Continued from Page 231)

That feature satisfactorily settled, he sought for some way of getting the drops to the top to be measured, faster than they would float there naturally. He bethought him of our old friend centrifugal force. That is the natural force that keeps the water in a kid's play-bucket when he whirls it round his head on the end of a string—we've all done that trick.

When you whirl a mixture of things in a centrifugal machine the heaviest parts of the mixture go to the outside and the lightest come to the inside. The

faster you whirl the quicker this sorting is accomplished.

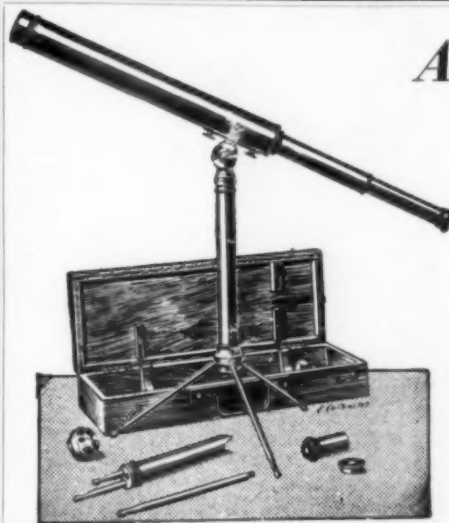
The watery-solution part of milk is heavier than butterfat. That is why cream rises to the top. Why not centrifuge the acidified milk samples, and thus make the butterfat drops get a move on?

That is what Professor Babcock did. Then he added the highly practical detail of so regulating the size and shape of the bottles he put into the machine to be whirled that the percentage of butterfat could be read off directly by the marks scored on their long necks.

Thus was the Babcock test given to the world forty years ago, and thus it remains to this day, without the change of a single essential feature. There are dozens of manufacturers of testers all over the world, making machines all the way from modest two-bottle affairs whirled by hand up to big ones holding a couple of dozen bottles, warmed by steam and driven by electric motors. But basically they are all alike. There is probably no modern invention that has so radically reformed a great industry with so little change in itself over more than half a lifetime.

Science News Letter, October 11, 1930

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First Glances at New Books

Biology

THE CONQUEST OF LIFE—Theodore Koppányi—*Appleton*, 263 p., \$2. This extremely readable book tells the story of life in a simple, interesting way. The subjects covered range from the single-celled ameba to the human embryo, evolution, glands, sex, diseases, the advances of modern medicine and psychology. In spite of this wide range, there is no confusion and the various subjects are easily but clearly explained. The intelligent layman will find a sane, simple exposition of topics that are being discussed today. The book is one of the New World of Science series, and is the principal selection of the Scientific Book Club for September.

Science News Letter, October 11, 1930

Paleoclimatology

THE PAST CLIMATE OF THE NORTH POLAR REGION—E. W. Berry—*Smithsonian*, 29 p., 15c. Dr. Berry, after applying the touchstone of paleobotanical knowledge to the problem of ancient Arctic climate concludes: "There is no unequivocal botanical evidence of tropical or sub-tropical climates at any time in the Arctic. There is no evidence from paleobotany of a lack of climatic zonation at any geological period from which fossil plants are known, although at such times the evidence points to a relative mildness and a lack of sharp zonation, as compared with the present. The distribution of the known fossil Arctic floras with respect to the present pole proves . . . that there could have been no wandering pole."

Science News Letter, October 11, 1930

Astronomy

THE SPECTROHELIOSCOPE AND ITS WORK—George E. Hale—*Carnegie Institution of Washington*, 47 p., \$1.25. To George E. Hale science must give thanks for his inspiration of Yerkes Observatory, Mount Wilson Observatory and now the projected 200-inch telescope. As such gigantic instrumental projects are contemplated, Dr. Hale's own researches upon the sun might be overlooked. In this reprint from the *Astrophysical Journal*, Dr. Hale describes the history, instruments, adjustments and methods of observations with the spectrohelioscope, an instrument of simple construction which can be used to observe the "storms" upon the sun. Activity upon the sun is of importance to dwellers upon the earth. And Dr. Hale visualizes the time when amateur and professional observers in all parts

of the world will watch the face of the sun for activity and report it in order that actions of men and machines upon the earth may be governed accordingly.

Science News Letter, October 11, 1930

Economics

HOW GREAT CITIES ARE FED—W. P. Hedden—*D. C. Heath and Company*, 302 p., \$2.80. An apple a day costs a lot on the way, says the title of just one of the chapters devoted to the activities of the middlemen. The book is a good explanation of what the middlemen do to bring milk, fruits and vegetables to a tenth of the nation's people, and it is written by a man who knows—the chief of the Bureau of Commerce of the Port of New York Authority. It is edited by E. G. Nourse, director of the Institute of Economics.

Science News Letter, October 11, 1930

History

THE ANONYMOUS LA CONQUISTA DEL PERU (SEVILLE, APRIL 1534) AND THE LIBRO VLTIMO DEL SVMMARIO DELLE INDIE OCCIDENTALI (VENICE, OCTOBER 1534)—Edited with introduction and bibliography by Alexander Pogo—*American Academy of Arts and Sciences*, 110 p., \$1.75. The possibility that the anonymous "La conquista del Peru" could have been written by various known reporters of Pizarro's expedition is discussed in this monograph, and the verdict is negative. The conclusion is that the writer was probably a simple soldier and certainly a man of limited horizon and vocabulary. This publication also brings the text of the little known Spanish chronicle and the early Italian translation into accessible form for handy reference.

Science News Letter, October 11, 1930

Geophysics

TRANSACTIONS OF THE AMERICAN GEOPHYSICAL UNION TENTH ANNUAL MEETING, APRIL 25 AND 26, 1929; ELEVENTH ANNUAL MEETING, MAY 1 AND 2, 1930—*National Research Council*, 314 p., free. In this volume are gathered together the many important papers presented at the last two meetings of the American Geophysical Union. Of particular interest are the reports by members of the Carnegie Institution staff of the results of the last voyage of the non-magnetic ship *Carnegie*, which ended so tragically last November.

Science News Letter, October 11, 1930

Ethnology

EDDIC MYTHOLOGY—John A. MacCulloch—*Archaeological Institute of America, Marshall Jones*, 400 p., \$10. This is the eleventh volume published in a series of thirteen entitled "Mythology of All Races." The Eddic poems are the great sources of our knowledge regarding the religious beliefs of the Teutons. From these old manuscripts come our vivid pictures of Frey and Thor, Odin, Loki, the Valkyries, Swan Maidens, trolls and werewolves, all acting out dramas against typical settings of the Scandinavian Viking Age. To what extent Scandinavian beliefs were held by other Teutonic peoples is one of the problems which scholars are attempting to answer by piecing together clues from archaeological remains, folk lore survivals, writings of Christian missionaries, ecclesiastical laws and other such sources. Dr. MacCulloch has brought a rich knowledge of his subject to his task of analysis and interpretation. Forty-seven illustrations bring before the reader's eye many scenes and objects that help to recreate the Teutonic world.

Science News Letter, October 11, 1930

Physiology

THE PHYSIOLOGY OF TWINNING—Horatio Hackett Newman—*University of Chicago Press*, 230 p., \$1.75. Current knowledge of twinning in various creatures, from earthworms to birds and from armadillos to humans is discussed by this well-known zoologist in this orderly little book. The volume is one of the University of Chicago Series "written not only for the specialist but for the educated layman."

Science News Letter, October 11, 1930

Chemistry

THE CONSTRUCTION AND EQUIPMENT OF CHEMICAL LABORATORIES—Various authors—*Chemical Foundation*, 340 p., \$1. This is a report of the National Research Council Committee on the Construction and Equipment of Chemical Laboratories, of which Rev. G. L. Coyle, S. J., of Georgetown University, is chairman. All aspects of chemical laboratories, both for students and for research, are fully covered, from the external construction to the details of equipment needed inside. Anyone who has to do with the design of a new chemical laboratory, or with the improvement of an old one, will find this book absolutely essential.

Science News Letter, October 11, 1930